In the Specification:

Please replace the paragraphs beginning on page 7, line 13 and continuing through page 8, line 12 with the following:

Differential detection in the traditional sense works by multiplying a signal with a delayed version of itself. The signal is generally delayed by a $\pi/2$ phase shift and a time delay of one period. However, the differential detector poses several problems in a low IF structure with limiting amplifiers. First, creating a phase shift of $\pi/2$ over the whole band width is problematic at low frequencies. Generally a $\pi/2$ phase shift is achieved by adding a delay of 90° to a signal to achieve a $\pi/2$ phase shift at that frequency. The problem is that at low frequencies when a 90° delay is applied, the band over which that delay corresponds to a $\pi/2$ shift is very small. In practice, an expensive poly-phase filter with many poles is typically used in order to achieve a $\pi/2$ phase shift across a band of frequencies. The second problem is that double frequency terms appear in differential receivers at low frequencies, and they cannot adequately be removed, causing a degradation of the detector performance. The final problem is that limiting the signal will produce harmonics that are located very close together, causing interference.

To solve these problems, the data detector 180 of the present invention first eliminates the $\pi/2$ phase shift. Because both in-phase and quadrature phase components were available in the received signal, the $\pi/2$ phase shift is unnecessary. The quadrature phase component of the signal is a 90° shift of the in-phase signal, and thus the quadrature phase component will suffice as the $\pi/2$ shifted portion of the signal. Further, although a finite impulse response filter (FIR) is generally used to remove unwanted harmonics from a signal before performing the differential detection, in accordance with the present invention, it was discovered that the problematic terms can be handled by referring to the mathematics involved in producing the signal: